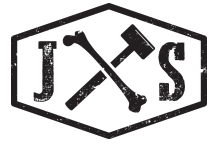




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## Intra-Operative Content: How To

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### Equipment:

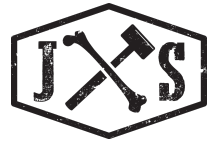
- **Camera/Lens**
  - GoPro Hero 11,10,9 with ND32 Filter (POV)
- **Go Pro: Head-mount (POV)**
  - Old Sunoptics head-gear
  - Welding headgear on Amazon
- **Storage**
  - SD Card (GoPro Max: 525GB)
- **Battery**
  - External Battery (REQUIREMENT)
- **\*\*See 'shopping list' on website\*\***

### Set-Up:

- **Go Pro Set Up**
  - Mount secured to front of old sunoptics head-gear or welding headgear found on amazon (using sticky mount, zipties)
  - Special adapter for easy positioning from base mount to camera
  - Special gopro battery door with opening for continuous charging
  - USB C to USB C cable
  - GoPro with ND32 light filter lens
- Personal Cell Phone with GoPro Quik App



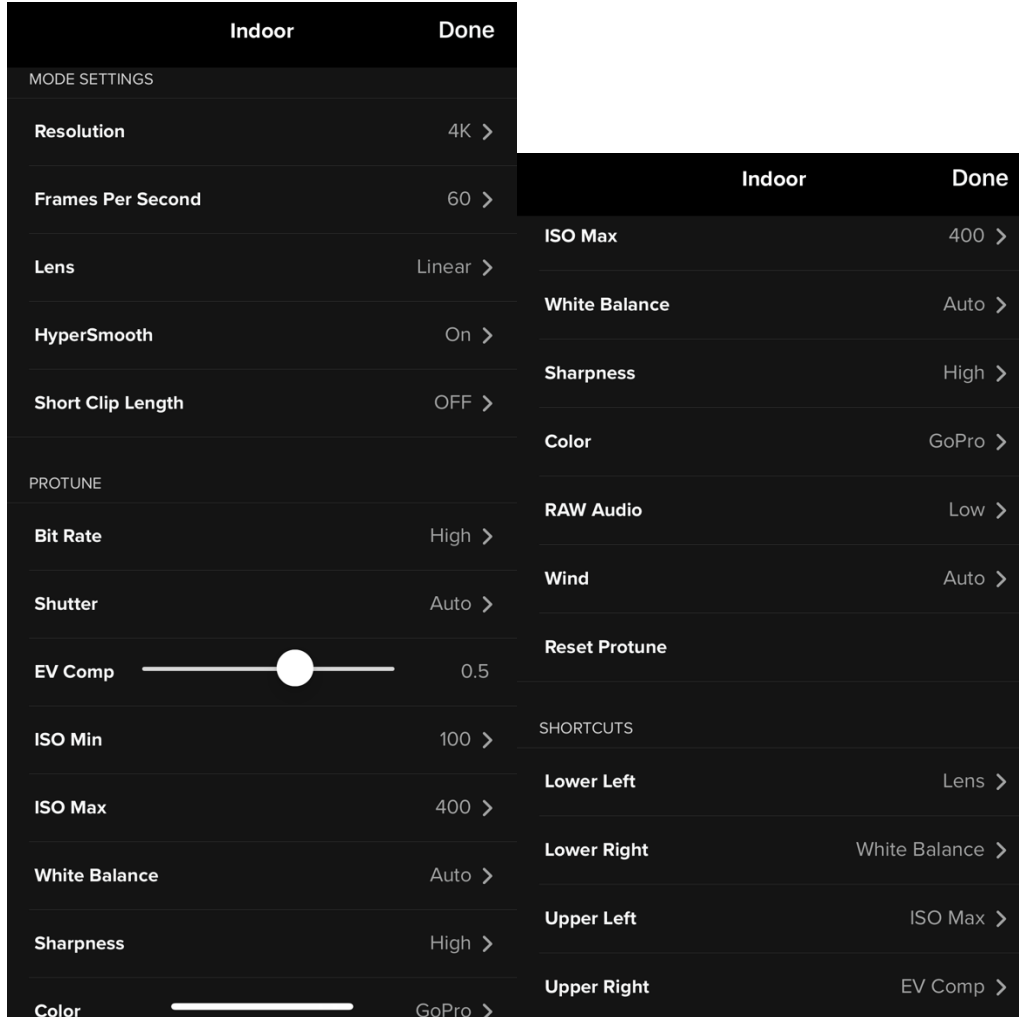
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Settings:

- **Camera Settings**

- Once camera is set up through the app, create a “intra-operative’ setting:

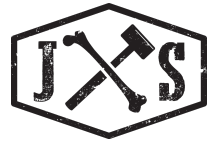


- Lock orientation of camera (personal one is upside down)
- Once this setting is created and selected, open the app with a live view of your camera feed, position the camera so that it is centered over where your hands will be in the OR (may need to remove light filter or position yourself in bright light during this step)
- Turn on the “SPOT LIGHT METER” Function (\*\*IMPORTANT\*\*)
- Hit Record
- Final Check before scrubbing in (spot light meter is on, battery is charging, camera position is correct)
- Ready to film
- Once done with the case, stop the camera.



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- When home or at computer, pull out the SD Card and download to your computer/external hard drive

### Intra-Op Pitfalls:

- **Lighting**
  - Pitfall: Image is blown out (aka too much light)
    - Ensure you have ND32 light filter on and appropriate settings selected
    - Can still blow out image if **spot light meter** wasn't turned on or OR lights are too focused in the field. Consider twisting handle of OR lights to widen focus of lights, or staggering the two OR lights to different focal points.
- **Head Motion**
  - Image stabilization is very good with gopro, but to capture "KEY" steps be sure to have head in appropriate position
  - Pitfall: Too much head motion; ensure orientation is locked on camera, image stabilization is on, surgeons motions are smooth and not jerky (don't spin head around to mayo stand, to circulator, etc). You only need a couple seconds of a good clip, but giving yourself more options makes editing easier and the final product better.
- **Battery**
  - Ensure the "Lightning Bolt" symbol is activated over the battery symbol of the gopro prior to scrubbing in (means it is charging)
  - Pitfall: Forget to charge battery; Be sure your external battery had been fully charged the night prior
  - Pitfall: Camera runs out of battery mid-case; Make sure battery is still charging camera once you hit record, if battery is too weak the lightning bolt symbol will disappear (meaning the camera is no longer charging)

### Publication Outlets:

- **AAOS OVT (Orthopaedic Video Theatre)**
  - Peer Reviewed Videos on many different topics
- **AAOS OrthoDome**
  - AAOS New 4k Video Library
- **Specialty Journals**
  - Video Journal of Sports Medicine (VJSM) – associated with AJSM
  - JBJS Techniques

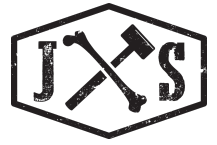


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- Arthroscopy Techniques
- POSNA
- ASSH Hand Technique Videos
- OTA Trauma Technique Videos
- Etc
- **Non-Peer Reviewed Sites**
  - VuMedi (non-peer reviewed)
  - You-Tube (non-peer reviewed)

### Editing:

- **Adobe Premier Pro (or other video editing software)**
  - Set sequence to 1080p (for AAOS OVT) or 4k (for AAOS OrthoDome)
  - Begin by editing the front and the end to start and finish of the procedure
  - Then select clips (several seconds, not much more), of important steps in the procedure (pick the best clips that demonstrate this to the viewer)
    - Positioning
      - Consider zooming out of frame to include entire patient/extremity
    - Landmarks for incision/markings incision
      - Consider zooming out of frame to include entire patient/extremity
    - Superficial dissection
      - Consider overlays with a still frame to identify tissue planes, muscles, N/V structures, etc.
    - Deep Dissection
    - Work performed
      - Can include intra-operative fluoroscopic images
      - Can include saw bone with retractors/instruments over green screen in corner
    - Closure
      - First stitch, then finished layer/structure
  - Pearl: Use the 4k or 5.3k original footage to be able to move around your frame so that the incision or target is centered in the frame. If you are editing a 4k image at 1080p you are using only half the frame, so you have lots of mobility while maintaining good resolution. You can get fancy if there is a lot of head motion and move the frame position throughout the clip (see youtube)
  - Pearl: If you think you can do it or not sure how to (google and watch a youtube video), likely you will be able to

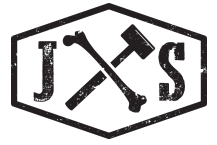


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- Pearl when selecting clips to include, focus on clips in which the instrument is coming into the frame, then performing its function, then coming out; similar goes for retractor placement during exposure (must be concise but include important steps)
- Once your editing is complete, you have added your PowerPoint slides as photo images, you may then record audio over your presentation. Recommend using a special USB microphone. (See shopping list)

### Other Important Considerations:

- **Medical Legal:**
  - Obtaining appropriate Consent
  - Blurring out faces, PHI, tattoos, and other identifying information
- **Making a High Quality surgical video:**
  - Know your crowd (other surgeons, residents, patients), the same content should be edited in different ways to appeal to each
  - Use a high quality microphone (not your camera, not the original gopro audio, see ideas on shopping list)
  - Focus on important steps and keep it brief (imagine if you were trying to learn this case, what you would want to know/see)
  - Include fluoroscopy images/arthroscopy tower footage/sawbones/etc (picture in picture) to help viewers
- **Technical considerations:**
  - Recording in greater resolution gives you more options with video, however takes up lots of space and requires more computing power
  - Edit on a powerful enough computer (otherwise it will take forever to edit and render) (see shopping cart)
- **Have FUN!**